

CLAIMS:

- Sub 61
1. An imaging system comprising:
an exam prescription subsystem which specifies the manner in which data is
to be acquired; and
a visualization subsystem responsible for controlling display of acquired
images and data.
 2. An imaging system in accordance with Claim 1 further comprising a
data acquisition system for acquiring scan data, and an operator console comprising
said exam prescription subsystem and said visualization subsystem.
 3. An imaging system in accordance with Claim 1 further comprising an
archive subsystem for storage of imaging data.
 4. An imaging system in accordance with Claim 1 further comprising a
filming subsystem for transferring data onto film.
 5. An imaging system in accordance with Claim 1 further comprising a
networking subsystem that transfers data via a network to external devices.
 6. An imaging system in accordance with Claim 1 wherein said exam
prescription subsystem acquires parameter data comprising at least one of a
sequence of slice locations, slice thickness, field-of-view, scanning technique, and
reconstruction algorithm.
 7. An imaging system in accordance with Claim 6 wherein said
parameter is contained in a scan protocol.
 8. An imaging system in accordance with Claim 1 wherein said
visualization subsystem comprises a rendering component configured to receive data

from at least one of a data acquisition system, a filtering component of said visualization subsystem, and a segmentation subsystem of said visualization subsystem, said rendering component configured to generate multiple images based on the acquired data in at least one of a real-time mode and a post-acquisition mode.

5 9. An imaging system in accordance with Claim 1 wherein said visualization subsystem is configured to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three-dimensional view of the data is displayed.

10 10. An imaging system in accordance with Claim 9 wherein said visualization subsystem is further configured to operate in a static data rendering mode and a mixed data rendering mode.

15 11. An imaging system in accordance with Claim 9 wherein said volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, said rotation angle varying cyclically as the 3D model is rendered from frame to frame.

20 12. An imaging system in accordance with Claim 1 wherein said visualization subsystem is configured to operate in a review display mode, said review display mode comprising at least one of a playback mode and a repeat loop mode.

25 13. An imaging system in accordance with Claim 1 wherein said visualization subsystem generates at least one volumetric model, and wherein projection of said volumetric model onto an image plane is accomplished using at least one of ray casting and texture mapping.

 14. An imaging system in accordance with Claim 13 wherein said volumetric model is incrementally rendered.

15. An imaging system in accordance with Claim 13 wherein said volumetric model is rendered using a sliding window.

16. An imaging system in accordance with Claim 13 wherein said volumetric model is defined in a hierarchical data structure.

5 17. An imaging system in accordance with Claim 1 wherein said rendering subsystem is operable in at least one of a single slice mode and a multiple slice mode.

10 18. An imaging system in accordance with Claim 1 wherein said system utilizes at least one of computed tomograph, magnetic resonance, and ultrasound acquired data to generate an image.

15 ✓ 19. A visualization subsystem for a medical imaging system, the medical imaging system including a data acquisition system for acquiring scan data, said visualization subsystem comprising a processor programmed to render an image from data received from at least one of the data acquisition system, a filtering component of said visualization subsystem, and a segmentation subsystem of said visualization subsystem

20 20. A visualization subsystem in accordance with Claim 19 wherein to render an image, said processor is programmed to generate multiple images based on the acquired data in at least one of a real-time mode and a post-acquisition mode.

21. A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to apply image processing filters to the data received from the data acquisition system.

✓ 22. A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to classify data into separate categories.

23. A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to perform measurements on the data, said measurements comprising at least one of distance, surface area, volume, regions of interest, and calcification scoring.

24. A visualization subsystem in accordance with Claim 19 wherein the image is rendered in at least one of a real-time mode and a post-acquisition mode.

25. A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to annotate patient and scanning information.

26. A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three-dimensional view of the data is displayed.

27. A visualization subsystem in accordance with Claim 26 wherein said processor is further programmed to operate in a static data rendering mode and a mixed data rendering mode.

28. A visualization subsystem in accordance with Claim 26 wherein said volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, said rotation angle varying cyclically as the 3D model is rendered from frame to frame.

29. A visualization subsystem in accordance with Claim 26 wherein said visualization subsystem is configured to operate in a review display mode, said review display mode comprising at least one of a playback mode and a repeat loop mode.

30. A visualization subsystem in accordance with Claim 19 wherein said processor generates at least one volumetric model, and wherein projection of said

volumetric model onto an image plane is accomplished using at least one of ray casting and texture mapping.

31. A visualization subsystem in accordance with Claim 30 wherein said volumetric model is incrementally rendered.

5 32. A visualization subsystem in accordance with Claim 30 wherein said volumetric model is rendered using a sliding window.

33. A visualization subsystem in accordance with Claim 30 wherein said volumetric model is defined in a hierarchical data structure.

10 34. A visualization subsystem in accordance with Claim 19 wherein the scan data at least one of computed tomograph, magnetic resonance, and ultrasound acquired data.

35. A method for operating a medical imaging system to generate three dimensional models while the system acquires cross-sectional data, said method comprising the steps of:

15 acquiring a first slice of data; and

generating a three dimensional model based on the first slice of data.

36. A method in accordance with Claim 35 wherein generating a three dimensional model comprises the step of filtering the data.

20 37. A method in accordance with Claim 35 wherein generating a three dimensional model comprises the step of classifying the data into separate categories.

38. A method in accordance with Claim 35 further comprising the step of performing measurements on the data, the measurements comprising at least one of distance, surface area, volume, regions of interest, and calcification scoring.

5 39. A method in accordance with Claim 35 wherein generating a three dimensional model comprises the step of annotating patient and scanning information.

40. A method in accordance with Claim 35 wherein generating a three dimensional mode comprises incrementally updating a three-dimensional view of the data.

10 41. A method in accordance with Claim 40 further comprising the step of applying a rotation angle to the model, the rotation angle varying cyclically as the model is rendered from frame to frame.

15 42. A method in accordance with Claim 35 wherein generating a three dimensional mode comprising the step of projecting the model onto an image plane using at least one of ray casting and texture mapping.

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